Mulching Specifications

Mulching is essential on most critical areas or slopes of 3:1 or steeper (Sodding may be used in lieu of mulching). On other sites (which are moderately fertile to fertile) with flatter slopes planted at optimum time for the species, mulching may be omitted. Mulching will commence immediately after seeding unless otherwise specified.

The following Methods of Mulching are acceptable:

A. Hay or Small Grain Straw Mulch

1. Perennial native or introduced (tame) grass. At least 50 percent of the herbage by weight must be ten (10) inches or longer before being applied to the site. Seed hay may be used if the same as the species used in the seeding; otherwise, hay should be free of seed. Leguminous plants will not exceed 25% of the dry weight of the mulch.

2. Small grain straw shall consist of wheat, oats, flax, barley or rye straw from which grain has been removed. At least 50 percent of the stems by weight shall exceed six (6) inches in length before being applied to the site if anchored by asphalt or netting. When anchored mechanically, 50% of the stems by weight shall exceed ten (10) inches.

3. Mulched areas will not be grazed until vegetation is established.

4. Hay or small grain straw shall be free of visible mold or fungus, noxious weed seed or seed of other competitive plants.

5. Mulch will be spread uniformly, by hand or mechanically, at the rates shown in Table 1. When spread by hand, the bales of hay must be torn apart, “fluffed up” and spread uniformly over the area. For uniform distribution of hand spread mulch, divide area into sections of approximately 1,000 square feet. Place the mulch, at rate shown in Table 1, in each section for distribution. Mulches shall not be applied when wind velocities exceed 15 miles per hour. If excessive breakage of mulch occurs during spreading or anchoring, mulch will be “wet down” with sprinkler or other suitable means.

6. Hay or straw mulches will be anchored using one of the following methods:

   a. Peg and Twine - Drive 8 to 10 inch wooden pegs to within 2 or 3 inches of the soil surface every 4 feet in all directions. Secure mulch to soil surface by stretching twine between pegs in a criss-cross within a square pattern. Secure twine around each peg with two or more round turns or a clove hitch.

   b. Mulch Nettings - Staple paper, cotton or plastic netting to the soil surface according to manufacturer's recommendations; or as shown on detail sheet, "Mulch Net Application Procedures" attached to these specifications. Mesh size of fabric shall not exceed 1 ½ inches by 3 inches.

c. Hand Anchorage - With a square pointed spade, punch mulch into the surface soil in contour rows 12 inches apart.

d. Mechanical Mulch Anchoring

(1) Tools - Use a heavy straight coulter type mulch tiller (Imco). 1/ The coulters should be one-fourth inch thick and be of sufficient diameter to prevent the frame from dragging the mulch. The edges should be dull so as not to cut the mulch during the anchoring operation. The edges may be serrated or smooth; if serrated, the scallops should not be more than 3 inches in length and 3/4 inch in depth. The rows or furrows made by the mulch tiller shall be spaced 6 to 12 inches apart. Penetration depth should be 2 to 3 inches. The mulch should not be covered with excessive amounts of soil. Limit to no more than 2 passes by the mulch tiller. All mulching operations will be done on the approximate contour.

1/ A farm disk set straight may be used if weight is added to provide for penetration depths, and, providing it tucks the material without cutting. Travel speeds must be reduced to prevent excessive burial of seed and mulch material. A rotary hoe may be used if soil is not too compacted. A fairly high rate of speed is necessary.

(2) Site Preparation - When using a mulch anchoring tool, the seedbed must be loosened to a minimum depth of 3 inches prior to placing and anchoring mulch material. This is necessary for the 2 or 3 inch penetration required for mulch anchorage. (Drill or seeding equipment used at this time must be equipped with depth bands as to the ability to obtain a firm seedbed is improbable.)

1/ e. Asphalt Emulsion Mulch Tack - Asphalt emulsion shall consist of liquid emulsions of water and natural bituminals of asphalt grade SS-1 or equivalent. The SS-1 will be continuously applied with an emulsion spray system equipped with a mechanical mulch hay blower. Application temperature will be 50° F or greater (air temperature). The asphalt shall be applied with a mechanical mulch blower equipped with an emulsion spray system having a heating unit.

1/ f. Resin Emulsion Mulch Tack - Shall consist of liquid emulsion of water and natural petroleum resins of a type and grade similar to Petroset SB, Aerospray 70, or Curosol AH. The resin shall be applied with a mechanical mulch blower equipped with an emulsion spray system having a heating unit.

7. Application rates are shown in the following table:

1/ Under conditions of extreme winds, some "peeling" of mulch may occur. This should be considered in selection of method used to anchor mulches.

Table 1. - - Application rates for hay, straw, and flax Mulch anchored with anchoring tools or other methods.

Method of anchoring And mulch	Rate for mulch (lbs)		Rate for asphalt or Resin Emulsion Tack	
	Per Acre	Per 1,000 sq. ft.	Gallons Per Acre	Gal. Per 1000 sq. ft.
Anchored with mulch Tiller.				
Native or tame hay	3-4,000	70-90	-	-
Small grain straw	4-5,000	90-115	-	-
Flax	3-5,000	70-115	-	-
Anchored with Asphalt or Resin Emulsion.				
Native or Tame hay	3,000	70	300	7
Small grain straw, flax	3,000	70	300	7
Anchored with other 1/				
Native or tame hay	3,000	70	-	-
Small grain straw, flax	3,000	70	-	-

1/ Includes Hand Anchorage, Netting, and Peg and Twine Methods.

B. Barnyard Manure – strawy manure can be uniformly spread on the soil surfaces as a mulch.

1. Apply 15-20 tons per acre on soil surface without subsequent tillage.

2. Apply 30-40 tons per acre on soil surface if application is followed by disk implement for anchorage.

C. Excelsior Erosion Blankets

Excelsior mat can be used to mulch small critical areas.

1. Upon completion of seed bed preparation, fertilization and drilling of seed, excelsior blankets will be installed.

2. The excelsior erosion blankets will be equivalent to the "Curlex" (trademark) blanket manufactured by the American Excelsior Company, Arlington, Texas. Material specifications are as follows:

   The excelsior blanket shall consist of a machine produced mat of curled wood excelsior of 80 percent 6-inch or longer fiber length with consistent thickness and the fiber evenly distributed over the entire area of the blanket. The top side of each blanket shall be covered with a 2" X 1" biodegradable mesh. The blanket shall be smolder resistant.

3. The area to be covered shall be properly prepared, fertilized seeded before the blanket is applied. When the blanket is unrolled, the netting shall be on top and the fibers in contact with the soil over the entire area. In channels the blankets shall be applied in the direction of the flow of water. On slopes, the blankets shall be applied across the slope. Ends and sides shall be butted snugly and stapled, in both instances.

4. The excelsior blanket will be secured to the ground with wire staples. Staple wire will be .091 – inch in diameter or greater. Staples will be "U" shaped with legs 6 – inches in length with a 1 – inch crown.

5. The staples shall be driven vertically into the ground, spaced approximately two (2) lineal yards apart, on each side of blanket, and one row in the center alternately spaced between each side. Use a common row of staples on adjoining blankets.

6. Staple installation is shown on the detail sheet attached to these specifications.

D. Asphalt, Asphalt Emulsion, and Resin Emulsion

1. Asphalt shall be liquid or cut back asphalt of grade RC-1 or equivalent and shall contain no water.

2. Asphalt emulsion shall consist of liquid emulsions of water and natural bituminals of asphalt grade SS-1 or equivalent.

3. Resin emulsion shall consist of liquid emulsion of water and natural petroleum or acrylic resins prepared specifically for soil stabilization. These materials include such products as Phillips Petroleum, Petroset SB; American Cyanmide, Aero-spray 70; and Curosol AH.

4. Resin emulsion, asphalt emulsion and cut back asphalt shall be applied with an emulsion spray system having a heating unit.

5. Table 2. - - Rate of Application of Resins and Asphalt Mulches:

Mulch	Soil Type	Rate: Cups 1/ Per sq. yd. material	water	Rate: Gallons Per Acre material	water
Resin Emulsions 2/					
Petroset SB	Loamy Sand	5/8	6	200	1800
Aerospray 70	and	5/8	6	200	1800
Curosol AH	Sandy Loam	1/8	6 ½	50	1950
Petroset SB	Loams	5/8	4 ½	200	1300
Aerospray 70		5/8	4 ½	200	1300
Curosol AH		1/8	4 ½	50	1450
Asphalt Emulsion SS-1	all soils except silty clays and clays	4	None	1200	None
Cutback Asphalt RC-1	All soils	4	None	1200	None

1/ Conversion of Cups to Gallons: 16 cups = 1 gallon
2/ Not recommended for use on clays.

6. Under conditions of extreme winds some “peeling” may occur. This should be considered in selecting this method of mulching.

E. Wood Cellulose Fiber Mulch (Hydro-Mulching)

1. Wood cellulose fiber mulch shall consist of wood cellulose fiber pulp which shall contain no germination or growth inhibiting factors. This mulch shall be free of contamination from noxious weed seed, seed from other competitive plants, mold, or fungus. It shall be dyed an appropriate color to allow visual metering of its application, and shall have the property of becoming dispersed and suspended when agitated in water. When sprayed uniformly on the surface of the soil, the fibers shall form a blotter-like ground cover that readily absorbs water and allows infiltration to the underlying soil.

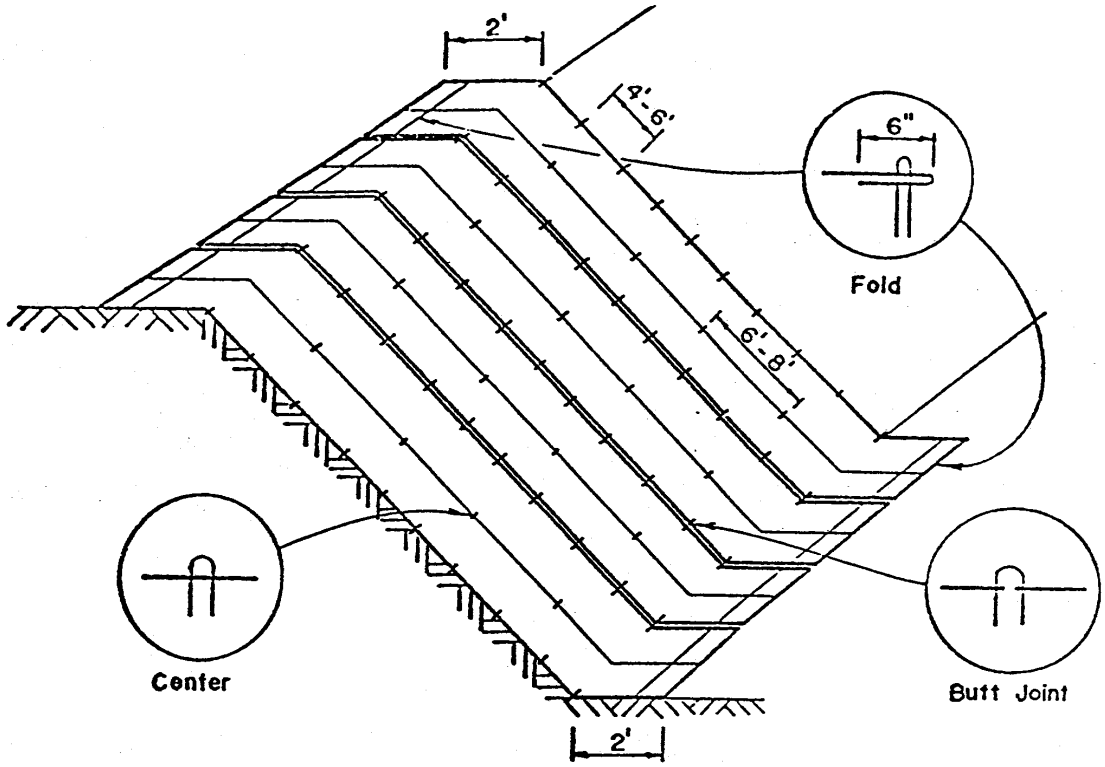
2. Weight specifications from suppliers, and for all applications, shall refer only to air-dry weight of the fiber, a standard equivalent to ten percent moisture. Each package of the cellulose fiber shall be marked by the manufacturer to show the air-dry weight content. Suppliers shall certify, upon request of the engineer, that laboratory and field testing of their product has been accomplished and that it meets the foregoing requirements and intent. Sampling and testing for moisture content will be in accordance with ASTM D 2016, Oven Drying Method.

3. Wood cellulose fiber mulch shall be applied with hydraulic spray equipment at the rate of 1,500 to 2,000 pounds per acre. The fiber shall be added to the water slurry in a hydraulic seeder along with the proportionate quantities of seed, fertilizer, and other approved materials. All ingredients shall be mixed to form a homogenous slurry. Using the color of the mulch material as a metering agent, one shall uniformly spray the slurry mixture on the prepared seed bed.

4. A non-toxic, organic soil stabilizer may be included or added to the wood cellulose fiber where there is a high probability of wind or water erosion. Application rates of such soil stabilizers will be at the manufacturer’s recommended rates.

5. Since this method is basically a broadcast (surface) application of seed, the mulched area will be kept moist, by sprinkler or other means, for a period of thirty (30) days.

6. Under conditions of extreme winds some “peeling” may occur. The mulch also is subject to washing away under intense or prolonged rains. These factors should be considered in selecting this method of mulching.



MULCHNET APPLICATION PROCEDURES--SLOPES

1. Prepare a smooth cultivated firm seedbed. Remove all rocks, clods, roots, etc.

2. Seed and fertilize.

3. Apply mulch.

4. Apply Mulchnet as shown in the diagram (on short slopes Mulchnet can be applied horizontally).

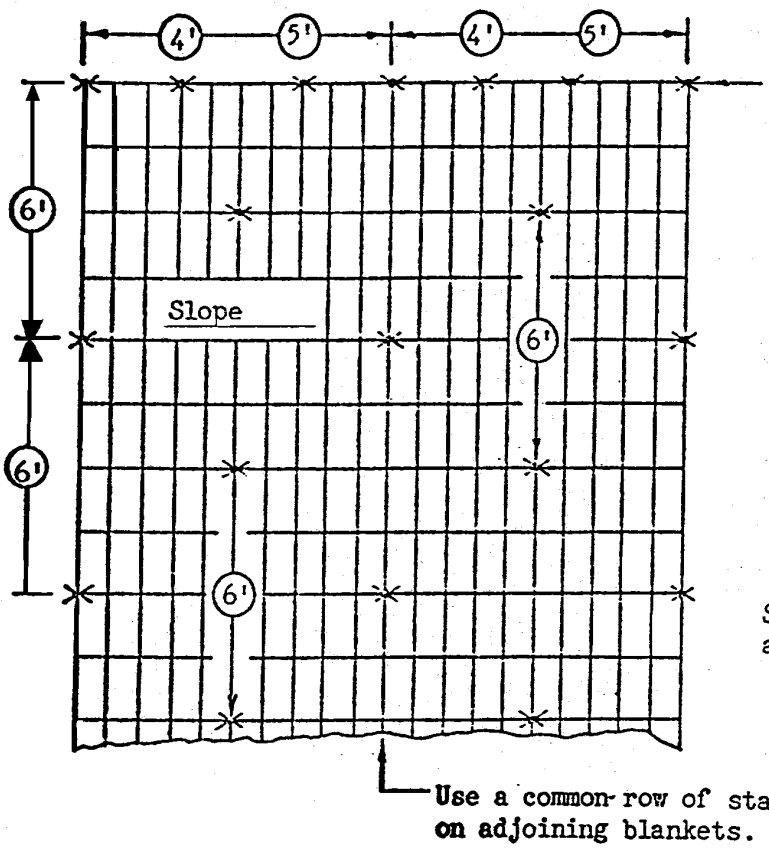
   a. Do not stretch Mulchnet but keep taut in the vertical direction.

   b. Use wire staples as shown. The staples to be used are:
      - in normal soil conditions—6″ long and .091″ diameter.
      – in rock or hard-packed clay-like soil—6″long and .120″ diameter.
      – in sandy or external loose soil, contact supplier for recommendations.

   c. Spacing for staples:
      - on butt joints and outside edges—4′to 6′ intervals.
      – in center of cloth 6′to 8′intervals.
      – on top and bottom folds, one in each edge and one in the center.
      MAKE SURE THAT ALL STAPLES BRIDGE THE POLY THREADS ON THE EDGE OR CENTER OF THE CLOTH.

   d. Stapling procedure:
      - attach top fold and work down slope applying staples in the edge and center as prescribed (walk-in open area as shown by the butt joint arrow).
      –lay out one to three widths of cloth in advance to stapler.

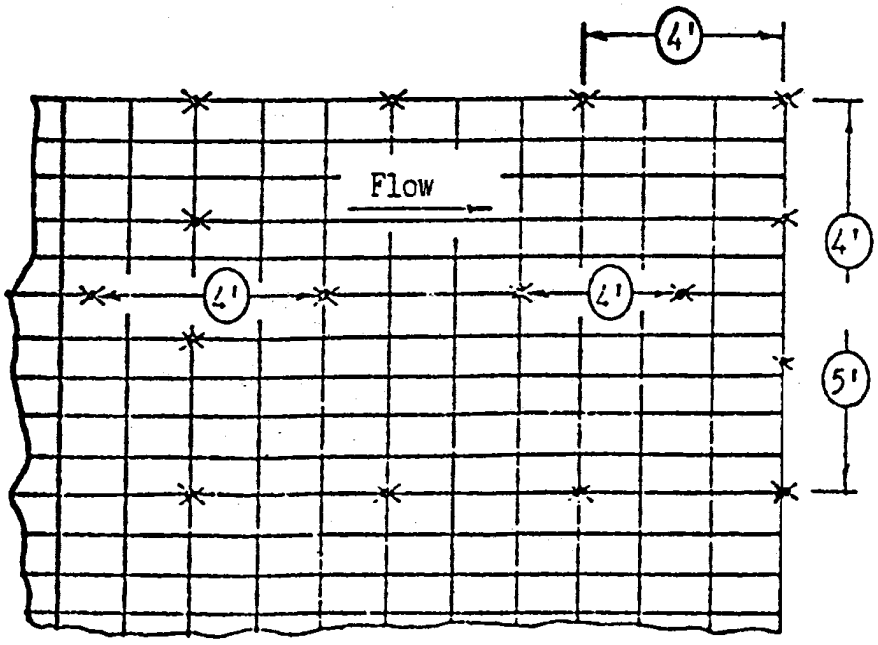
STAPLE INSTALLATION
EXCELSIOR BLANKETS
SLOPES



Use 4 staples across at the start of each roll and continue to staple throughout the length of the roll at 6 ft. intervals.

Staples will appear as "5" on dice.

Use a common row of staples on adjoining blankets.



Use 4 staples across at the start of each roll and continue to staple throughout the length of the roll at 4 ft. intervals.

Use a common row of staples on adjoining blankets.

NRCS, ND
June 1977

United States Department of Agriculture
Natural Resources Conservation Service
P. O. Box 1458
Bismarck, ND
58502-1458

Subject: TCH - Statewide Variance for Practice Standard Mulching (484)

Date: March 3, 1995

To: All Technical Guide Holders

File Code: 450

The present practice standard for Mulching (484) does not address mulching for use on cropland. Until such time that the practice standard is revised, the following variance will apply:

> **"The current approved erosion prediction technology will be used to determine the amount of mulch required to reduce the erosion to acceptable levels."**

File this letter in the FOTG, Section IV, behind the practice standard Mulching (484). A note in the case file on the SCS-CPA-6, Conservation Assistance Notes, should be made referencing the variance or a copy of the variance inserted in the case file.

Myron P. Senechal

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State Resource Conservationist